

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
9 June 2005 (09.06.2005)

PCT

(10) International Publication Number
WO 2005/052905 A1

- (51) International Patent Classification⁷: **G09G 3/34**
- (21) International Application Number:
PCT/IB2004/052512
- (22) International Filing Date:
23 November 2004 (23.11.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
03104355.7 25 November 2003 (25.11.2003) EP
- (71) Applicants (for all designated States except US): **KONINKLIJKE PHILIPS ELECTRONICS N.V.** [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL). **E INK CORPORATION** [US/US]; 733 Concord Avenue, Cambridge, Massachusetts 02138-1002 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **ZHOU, Guofu** [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). **KNAIAN, Ara** [US/US]; c/o 733 Concord Avenue, Cambridge, Massachusetts 02138-1002 (US). **AMUNDSON, Karl, R.** [US/US]; c/o 733 Concord Avenue,

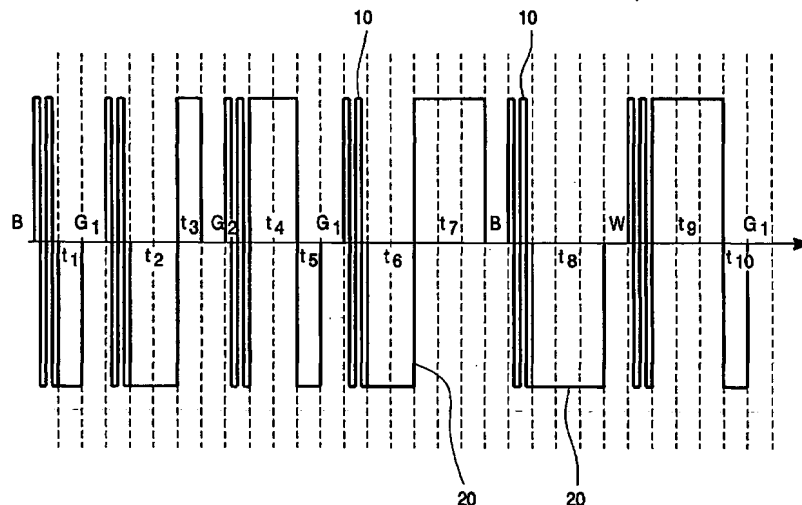
Cambridge, Massachusetts 02138-1002 (US). **HENZEN, Alexander, V.** [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). **VAN DE KAMER, Johannes, P.** [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). **ZEHNER, Robert, W.** [US/US]; c/o 733 Concord Avenue, Cambridge, Massachusetts 02138-1002 (US). **ZION, Benjamin, D.** [US/US]; c/o 733 Concord Avenue, Cambridge, Massachusetts 02138-1002 (US). **AILENEI, Neculai** [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

(74) Agents: **ROLFES, Johannes, G., A.** et al.; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: A DISPLAY APPARATUS WITH A DISPLAY DEVICE AND A CYCLIC RAIL-STABILIZED METHOD OF DRIVING THE DISPLAY DEVICE



(57) Abstract: A cyclic rail-stabilized method of driving an electrophoretic display device (1), wherein a substantially dc-balanced driving waveform is used to effect the various required optical transitions. The driving waveform consists of a plurality of picture potential differences (20), which cause the charged particles (6) of the electrophoretic device (1) to cyclically between extreme optical positions in a single optical path, irrespective of the image sequence required to be displayed, i.e. in order to display each grey scale, it is necessary for the particles (6) to first pass through one of the extreme optical states. In order to minimise the effects of dwell time on the image quality and minimise, or even eliminate, the need to consider image history, shaking pulses (10) are generated immediately prior to each picture potential difference (20).



(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *with international search report*